

A STUDY ON KNOWLEDGE MANAGEMENT PROCESS IN AGRITECH PORTAL AND SEEKING SUGGESTIONS FOR CONTENT MANAGEMENT

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ABSTRACT

This article aims to review, identify and explain the Intellectual Capital management process carried out in agritech portal of Tamil Nadu Agricultural University. Knowledge management is a brand new concept for Indian organizations and it is hard to gather information from limited number of organizations or companies for applied knowledge management carried out in portals. The study was focused on Knowledge management process in agritech portal followed by content management in the agritech portal and also indicated different suggestions given by 90 extension officers of Tamil Nadu by adopting semi-structured interview schedule and brainstorming method in order to manage the contents in agritech portal. The results of this study could be useful for knowledge management planners and managers in organizations and clear the prospects to deal with the challenges.

KEYWORDS: Knowledge Management Process, Agritech Portal, Content Management

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INTRODUCTION

e-Agriculture is an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. More specifically, e-Agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (IT) in the rural domain, with a primary focus on agriculture. e-Agriculture is a relatively new term and we fully expect its scope to change and evolve as our understanding of the area grows. Indian Agriculture contributes to 18.6 per cent of India's GDP, and approximately 59 per cent Indians derive their livelihood from the agricultural sector. Private sector initiatives like contract farming have commercialized the Indian agricultural sector. All stakeholders of agricultural dependents need information and knowledge about the main phases of the agriculture and allied system. Technology can be a powerful enabler to make Knowledge Management (KM) effective and to maximize its results.

Knowledge management efforts have a long history, to include on-the-job discussions, formal apprenticeship, discussion forums, corporate libraries, professional training and mentoring programs. With increased use of computers in the second half of the 20th century, specific adaptations of technologies such as knowledge bases, expert systems, knowledge repositories, group decision support systems, intranets, and computer-supported cooperative work have been introduced to further enhance such efforts. The most commonly used technology-support for KM is the KM portal that often forms part of a organizational Intranet.

Objectives

- To study knowledge management process in agritech portal.
- To enlist the suggestions from extension officials of Agricultural department about the contents of the portal.

Methodology

For the study of knowledge management process the Agritech Portal of Tamil Nadu Agricultural University was selected as the research arena. The Knowledge Management process was analysed by developing a framework based on the existing literature in the field which is presented in Table 1. The data was collected from the extension officials and experts by adopting a semi-structured interview and brainstorming. After collection of the data, analysis was carried out by following some statistical tools and methods.



Figure 1: Home page of Agritech Portal of Tamil Nadu Agricultural University

RESULTS AND DISCUSSIONS

Knowledge Management Processes

Knowledge management process is an iterative sequence of activities (Nissen, 2000). Building upon this notion, an outline from knowledge management frameworks, key elements of several life cycle models was explained in Table 1.

Table 1: Summary of Knowledge Management Processes Identified in Different Frameworks

Authors	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Wiig (1993)	Creation	Manifestation	Use	Transfer	
Arthur Anderson and APQC (1996)	Share-Create	Identify	Collect	Adapt-Organize	Apply
Van der Spek and Spijkervet (1997)	Develop	Distribute	Combine	Hold	
Holsapple and Joshi (1998)	Acquisition	Selection	Internalization	Use	
Gartner Group (1998)	Create	Organize	Capture	Access	Use
Davenport and Prusak (1998)	Generate		Codify	Transfer	
Mertins, Heisig and Vorbeck (2001)	Create	Store	Distribute	Apply	

Several key points emerged from review of the analyzed knowledge management frameworks:

- There is no single or commonly accepted definition of what constitutes a knowledge management framework.
- There are many concepts that are similar in the frameworks analyzed, but their ordering or structure varies.

Tamil Nadu Agricultural University (TNAU) holds first place for its new innovative activities. Among those innovative activities, agritech portal was considered to be a new outcome for e-agriculture society. In order to meet the needs of present day farmers, innovators and agripreneurs, different activities have been carried out by TNAU scientists and extension officials to make those needy individuals profitable and get satisfied.

Agritech portal was a technological outcome of ICT (Information and Communication Technology) based extension which provides information on all aspects of agricultural and allied sectors needed by farmers, innovators and agripreneurs in web based form. This portal provides knowledge on different areas like; agriculture, horticulture, post-harvest, agricultural engineering, biotechnology, market information, weather information, organic farming and schemes others. To make this portal as an effective and efficient knowledge dissemination system in supporting to conventional agricultural extension system knowledge management process had been followed. Knowledge management process involves different steps; acquiring, organizing, storing, sharing, accessing and use, for managing the knowledge. The knowledge management process of TNAU agritech portal is explained below.

Knowledge Management Process in Agritech Portal of Tamil Nadu Agricultural Universities

Acquiring

- Primary source of acquiring agricultural knowledge are; explicit knowledge given by the researchers and content validators of TNAU.
- Secondary source of acquiring knowledge are; case studies of successful farmers, scouting information from newspaper/magazines/books/periodicals/journals, agrinews from doordarshan programs- Ponvilayum Bhoomi etc., community radio, websites of different agriportals, literature on websites and youtube.

All the information is expertized to knowledge and uploaded daily in the agritech portal.

Organizing

All acquired information is well organized in a systematic manner. The content acquired is subjected to validation

for its effective results by a group of content validators; 60 research scientists representing different departments in agriculture had tested the content validity. If the information gains validity then the knowledge will be organized into different content sections viz., agriculture, horticulture, poultry, fisheries, forestry, marketing, and value addition etc.

Storing

All the acquired and organized knowledge will be stored in organization server of the e-Extension centre. By interlinking the organization server to the global network system, information will be stored in the cloud space and is now available to knowledge seekers globally.

Sharing

The knowledge stored will be shared within and outside of organisation through workshops, seminars, in and out training and several other means.

Accessing

The information or knowledge can be easily accessed through user interface on free of cost at anywhere and anytime. The knowledge seekers can get knowledge whatever they want to know regarding agriculture and allied sectors.

Use/Apply

The knowledge available on agritech portal is being utilized by the farmers, innovators and agripreneurs of different areas for earning profits by adopting the knowledge. Among Self Help groups mostly women and rural youths are accessing the knowledge about post-harvest practices, value added products and organic farming.

Suggestions Mentioned by the Extension Officials of Tamil Nadu Regarding Contents of Agritech Portal

In order to gather the suggestions of the experienced extension officers working in the department of agriculture, government of Tamil Nadu, three groups of extension officers who attended training on use of ICT tools at TNAU, Coimbatore were contacted. Questionnaires were distributed to all the extension officials in order to gather their opinion about the various contents of the agritech portal of TNAU.

Table 2: Suggestions of Extension Officials to Improve Agricultural Contents

Suggestions on Agriculture	Frequency (Percentage)
Soil test crop response (STCR) approach	88 (97.78)
Seed availability	85 (94.44)
Variety wise yield to be updated	83 (92.22)
Calendar of operation for different crops	80 (88.89)
Crop wise water requirement	77 (85.56)
Details of off season crops	76 (84.44)
Videos of Disaster to be added	73 (81.89)
Updating of Glossary	71 (78.89)

From table 2. It is evident that a range of 78.89 to 97.78 per cent of the Tamil Nadu agricultural extension officials suggested some important contents to be included in agritech portal. Among those suggestions, Soil Test Crop Response (STCR) approach was suggested by most of the extension officials (97.78%) as it is effective for targeted yield is unique in indicating both soil test based fertilizer dose and the level of yield that can be achieved with good management practices. Considering the increasing demand for seed supply and its shortages thereof, second most suggested (94.44%) was seed availability. Third suggested issue is to update variety wise yield as given by 92.22 per cent of extension officials.

As a trend, farmers were cultivating new crop varieties in appreciable way but they lack detailed information on yield obtained from those varieties. Fourth suggestion *in seriatim* was given by 88.89 per cent extension officials regarding calendar of operation for different crops, farmers were eager to know about calendar of events to be followed during crop specific operation for different crops in order to achieve sustained returns. Fifth suggestion (85.56 %) was of crop wise water requirement, since availability of water for agriculture is plummeting as there is irregular/scanty rainfall, non-availability of ground water and over exploitation of water resources which in turn has become restricting factor for wider cropping pattern by the farmers. Indian agricultural system is a gamble of seasons and monsoons and the demand to adopt sustainable agricultural practices by the farmers, the sixth suggestion (84.44 per cent) was pertaining to details regarding off season crops to be provided in the portal, as there should be alternates for assured crops in order to attain sustainability. Seventh suggestion was rendered by 81.89 per cent of officials about the videos of Disaster to be added in the portal, details about disaster and its management make the farmers aware about natural calamities, its consequences and survival measures during occurrences of any. Updating of Glossary was another imperative suggestion given by 78.89 per cent regarding agriculture in order to supplement information to farmers while accessing the portal to avail benefits.

Table 3: Suggestions of Extension Officials to Improve Horticultural Contents

Suggestions on Horticulture	Frequency (Percentage)
Stress management for horticultural Crops to be included	89 (98.89)
Block wise rainfall data to be updated	87 (96.67)
Latest information on companies involved in micro irrigation	85 (94.44)

From table 3, it is evident that extension officials suggested some vital horticultural contents to be included in agritech portal for the cause of farmers. Percentage of suggestions ranged from 94.44 to 98.89 per cent. Stress in horticultural crops was increasing as seasons are irregular and there is need for effective management practices for sustainable productivity in horticultural crops pertaining to this 98.89 per cent of extension officials suggested to include stress management details in horticulture contents of the portal. As rains are occurring irregular/ scanty the rainfall data should be collected block wise and to be updated in the portal was the second suggestion given by 96.67 per cent of officials in order to espouse farmer in selecting suitable horticultural crops and cropping pattern to yield sustainable profits. As water scarcity prevails in present day scenario micro irrigation pattern was a profound practice being followed effectively by the farmers to vintage profits. At present there are several companies providing micro irrigation services puzzling the minds of farmers in selecting approaching them. In this connect final significant suggestion was given by 94.44 per cent officials concerned about latest information on companies involved in micro irrigation to be provided in the horticultural contents of the portal.

Table 4: Suggestions of Extension Officials to Improve Sericulture Contents

Suggestions on Sericulture	Frequency (Percentage)
Pest and diseases in silk worm rearing may be highlighted	88 (97.78)
Source and availability of mulberry planting material and egg mass	87 (96.67)
N, P and K recommendation might be given as product wise viz., Urea, DAP and SSP	84 (93.33)
Videos of success stories to be updated	80 (88.89)

Table 4 displays the percentage of various suggestions given by extension officials to be included in the agritech

portal. Among those suggestions most of the extension officials (97.78%) suggested that Pest and diseases in silk worm rearing roots for revenue loses. So, it may be highlighted in the sericulture contents of the portal as farmers need more information on effective protection measures in silk worm rearing. The principle inputs in silk worm rearing are egg mass and mulberry planting material availing these inputs will setback head start for sericulture among farmers relating to this the second suggestion was given by 96.67 per cent of extension officials regarding source and availability of mulberry planting material and egg mass to be included in the contents of portal. The quality and quantity of leaf produced per unit area have a direct bearing on cocoon harvest in turn the quality and quantity depends on appropriate fertilizer dosages pertaining to this third suggestion was given by 93.33 per cent of extension officials regarding N, P and K recommendation might be given as product wise viz., Urea, DAP and SSP to facilitate the farmers. Regarding sericulture contents fourth suggestion given by 88.89 per cent of extension officials was about the motivation of farmers can be carried out by exposing them to various success stories in silk worm rearing and making them well acquainted with sericulture practices. In order to motivate them videos of success stories to be updated.

Table 5: Suggestions of Extension Officials to Improve Fisheries Contents

Suggestions on Fisheries	Frequency (Percentage)
Capture fisheries – Fishermen safety details	87 (96.66)
Culture fisheries – seed production techniques	85 (94.44)
Updating of integrated fish farming success stories	83 (92.22)
Combination of ornamental fish to be updated	82 (91.11)

From table 5, a percentage range of suggestions regarding fisheries content to be included in the portal was observed as 91.11 to 96.66 per cent. Fishermen going to capture fishes were put in danger during natural calamities with associate to this there are losses both in terms of man and material. Regarding that, capture fisheries section need to be improved by adding fishermen safety details as suggested by 96.66 per cent of the extension officials. In narrating culture fisheries section 94.44 per cent of extension officials suggested that seed production techniques of various fish species to be added since fish capturing was prone to various risks culturing of fish varieties is gaining importance as an enterprise and accompanying for economic development. Next suggestion in fisheries content was to update information on integrated fish farming along with stories of successful farmers earned appreciable profits through integrated fish farming as given by 92.22 per cent of officials and also highlighted that success stories will also acts as motivation factor for the fishermen and fish producers. About 91.11 per cent of extension officials suggested that combination of ornamental fish to be updated as compatibility of ornamental fishes is influential and prime factor in gaining economic importance.

Table 6: Suggestions of Extension Officials to Improve Schemes and Services Contents

Suggestions on Schemes and Services	Frequency (Percentage)
Updating of 2013-14 required	89 (98.89)
Guidelines of the schemes to be included	87 (96.67)
Application forms for schemes should be highlighted	85 (94.44)
Central and state sponsored schemes should be separated	83 (92.22)
Seed village scheme need to be updated	82 (91.11)

From table 6, it is clear that a range of 91.11 to 98.89 per cent of extension officials suggested regarding contents of schemes and services providing by governments to be comprised in the portal. Agriculture provides livelihood to majority of population and thus remains fulcrum of Indian economy. Though agriculture sector's contribution to national GDP has declined to 13.9% in 2011-12 due to relatively higher growth experienced in industries and services sectors,

agriculture remains the principal source of livelihood for more than 58% of country's population. In order to abet the farmers' first suggestion given by 98.89 per cent of extension officials was to update the schemes and services of 2013-14 in the portal. Second suggestion was given by 96.67 per cent of officials about guidelines of the schemes; what are the schemes and services provided by governments, How to apply, What are the benefits and the rest to be included in portal to make the farmers well acquainted with the schemes and services provided by the governments. 94.44 per cent of extension officials suggested that application forms for schemes should be highlighted in the portal. 92.22 per cent of extension workers suggested that central and state sponsored schemes should be separated in order to remove the perplexity regarding schemes provided by central and state governments. In order to promote quality seeds for improving production and productivity, Tamil Nadu Agricultural University is implementing seed village scheme for development and strengthening of seed infrastructure facilities for production and distribution of quality seeds through three Research Stations and 13 Krishi Vigyan Kendras of TNAU with financial support of government of India. Keeping this in mind 91.11 per cent of the extension officials suggested that seed village scheme need to be included and updated for the benefit of farmers.

Table 7: Suggestions of Extension Officials to Improve Agricultural Engineering Contents

Suggestions on Agricultural Engineering	Frequency (Percentage)
Details of recent implements	89 (98.89)
Updating of details about power operated rice transplanter	85 (94.44)
Farmer's success stories	84 (93.33)

From the table 7, it was observed that percentage range of 93.33 to 98.89 per cent extension officials given three notable suggestions regarding the contents to be managed in agritech portal of TNAU. Among those suggestions details about recent implements should be provided in the portal is the first suggestion given by 98.89 per cent of extension officials as developments in implements and refinements in the inventions can improve the things much better in this inadequate human resource aided agriculture. Second accentuated suggestion suggested by 94.44 per cent of extension officials was shortage of labour is overwhelming at present agriculture setup and there is transformation of conventional agricultural to mechanisation through the intervention of agriculture engineering department. In paddy there are several operations done by utilization of manpower due to labour deficiency those operations were carried out by transplanter and weeder etc. Power operated machines are now gaining much popularity regarding this updating of details about power operated rice transplanter should be included in the portal under agricultural engineering section. Extension officials of about 93.33 percentage suggested the third important content to be added in the portal was incorporation of various farmer success stories in utilization of new implements for their agricultural operations in order to motivate and enlighten the other farmers.

Table 8: Suggestions of Extension Officials to Improve Organic Farming contents

Suggestions on Organic Farming	Frequency (Percentage)
Text, picture or video about enriched FYM to be added	89 (98.89)
Details of green manure seed production and crop production	88 (97.78)
Organic plant protection details to be updated	87 (96.67)
Organic pest management options for oilseed crops to be updated	84 (93.33)
List out the organic dealers	80 (88.89)

Table 8 witnessed that 98.89 per cent of extension officials suggested that information without any succour cannot create impact in the minds of farmers to overcome this information should be assisted with text, picture or video to bring upbeat among farmers about enriched FYM utilization and its benefits. Green manure crops are very effective in improving soil fertility and soil quality by enriching the soil with nitrogen, phosphate and other important minerals and nutrients. It also helps in survival of useful micro-organism like nitrogen fixing bacteria and also helps in reducing the weed growth naturally. Concerned to this the next suggestion was given by 97.78 per cent of extension officials on details of green manure seed production and crop production. Currently everyone is contemplating on residual effects of chemical fertilizers and pesticides on agricultural as well as on human beings. Craving for human subsistence and organic agriculture persistence requisite on organic plant protection details to be updated in the portal as recommended by 96.67 per cent of extension officials. Next, 93.33 percentage officials suggested that organic pest management options for oilseed crops to be updated. In order to get the organic inputs or products easily for the farmers listing out the certified organic dealers in the portal was the suggestion given by 88.89 percentage of officials to avoid selection of fraudulent companies in the market.

Table 9: Suggestions of Extension Officials to Improve Seed Contents

Suggestions on Seed	Frequency (Percentage)
Block or district wise source of seed availability	88 (97.78)
Seed purchase details	85 (94.44)
Updating of seed production guidelines	82 (91.11)
Inclusion of details about Bt cotton	80 (88.89)
Details of private seeds might be included	78 (86.67)
Details about seed replacement ratio	77 (85.56)

From table 9, it is clear that a percentage range of suggestions given by extension officials was 85.56 to 91.11 per cent. In that range of suggestions 97.78 per cent of extension officials suggested block or district wise source of seed availability. Seed purchase details to be comprised in the portal under seed section was suggested by 94.44 percentage of officials so as to abet farmers in preparing their farm input investment since seed is the main input for agriculture. These days seed production is done by different group of actors without following proper guidelines recommended by seed certification authority. In order to check this 91.11 per cent of extension officials suggested for updating of seed production guidelines for producing certified seeds. Inclusion of details about Bt cotton was suggested by 88.89 per cent officials since there is demand for Bt cotton for its pest resistance attribute. About 86.67 percentage of officials suggested that details of private seeds might be included as private companies' are producing seed at huge amounts supporting the government seed production so as to meet the farmers' demand. Seed Replacement Ratio (SRR) is the percentage of area sown out of total area of crop planted in the season by using certified/quality seeds other than the farm saved seed to accustom this notion by farmers details about seed replacement ratio to be added in the portal as suggested by 85.56 per cent extension officials.

Table 10: Suggestions of Extension Officials to Improve Biotechnology Contents

Suggestions on Biotechnology	Frequency (Percentage)
Details about plant tissue culture companies	88 (97.78)
Extend the details of plant tissue culture to other crops	86 (95.56)
Video mode of plant tissue culture	83 (92.22)
GM crops like Bt Brinjal and Cotton to be updated	80 (88.89)

Table 10: Contd.,	
Updating of Novel and elite gene	78 (86.67)
Genetic transformation, transgenic plants and Recombinant DNA technology content	75 (83.33)
Provide link to biotech policy	73 (81.11)

From table 10, it shows that 97.78 per cent of extension officials suggested that tissue culture technology is gaining importance among farmers with the intention of growing pest and disease resistant plants in agriculture to drift up this, details about plant tissue culture companies should be included in order to get good seedlings from authorised dealers. As there is change from mono cropping to mix and integrated cropping pattern extending the details of plant tissue culture to other crops was suggested by 95.56 per cent of officials as it should meet the needs of the farmer. About 92.22 percentage of officials suggested to include video mode of plant tissue culture in order to aware farmers about tissue culture and in turn to create entrepreneur attribute within the farmers to start up an tissue culture enterprise on their own. Genetically Modified crops like Bt brinjal and cotton to be updated as suggested by 88.89 per cent of officials. Updating the information regarding Novel and elite gene was suggested by 86.67 percentage of extension officials. Contents describing or giving information about Genetic transformation, transgenic plants and recombinant DNA technology should be included in the portal was suggested by 83.33 percentage of officials. About 81.11 per cent officials suggested to provide link to biotech policy for the convenience of farmers.

Table 11: Suggestions of Extension Officials to Improve Forestry Contents

Suggestions on Forestry	Frequency (Percentage)
Various systems of Agro forestry to be included	88 (97.78)
Role of remote sensing and GIS for forestry	87 (96.67)
Details about tree breeding and cold assets	86 (95.56)
Details about tribal	83 (92.22)
Multipurpose tree species and their economy to farmers	81 (90.00)
National afforestation programmes	78 (86.67)
Details about social and urban forestry	76 (84.44)
Man and Animal conflict areas and their details	74 (82.22)
Updating of tiger reserves are needed	73 (81.11)
Details about International act for carbon sequestration and global warming	70 (77.78)
Contact details and phone numbers of Forest Extension Officers are to be updated	69 (76.67)
Updating of details about Eastern and Western Ghat development projects	67 (74.44)
Forest economy	65 (72.22)

From table 11, it is experiential that various contents to be endorsed and included in the forestry section of TNAU agritech portal as recommended by extension officials of Tamil Nadu region. Maximum of about 97.78 percentage suggested that agricultural alone cannot contribute to economic development of the nation rather with land-use system practices viz., agrisilviculture, silvopastoral systems and agrosilvopastoral systems etc. holds its contribution part in economic development. Pertaining to this, various systems of Agro forestry to be included in portal for crafting the farmers to adopt different types of agroforestry systems within the available resources. Next suggestion was the role of remote sensing and GIS to fathom the vegetation coverage and study the movement of wild life in the forest habitat and adopt sustainable natural resource management practices to be included within the contents of forestry section as given by 96.67 percentage of officials. Details about tree breeding and cold assets should be included in the portal was suggested by

95.56 per cent officials. Details about tribal should be provided in the portal for studying their socioeconomic aspects was suggested by 92.22 per cent. Details regarding multipurpose tree species and their economy to farmers was suggested by 90.00 percentage officials. National afforestation programmes to be provided through portal for rejuvenating and reconstructing the forest was suggested by 86.67 per cent extension officials. About 84.44 percentages of officials suggested to include details about social and urban forestry for generating employment to the people and yield economy to nation. Man and Animal conflict areas and their details should considered and to be included in the portal as given by 82.22 percentage of officials, remote areas and villages nearby forests are having this man and animal conflicts to larger extent as the degraded forest lands are compelling wild animals to come into human interface thereby destroying both farms and people life. As tiger is our national animal and are prone to vulnerability more than three fourth of the respondents (81.11 %) suggested the need for updating the information on tiger reserves in the portal. Climate change was uncontrollable due to larger emissions of carbon in various forms into the atmosphere is creating jeopardy. The concept of carbon credits and trading came into existence as a result of increasing awareness of the need for controlling emissions by IPCC (Intergovernmental Panel on Climate Change), details about International act regarding carbon sequestration and global warming (Global Warming Pollution Reduction Act of 2007) should be included for making aware about climate change and its consequences as suggested by 77.78 per cent of extension officials. Contact details and phone numbers of Forest Extension officers are to be updated in order to link the people with the extension workers for making things better by adopting different concepts in forestry like afforestation, reforestation and conservation etc., was suggested by 76.67 per cent of officials. About 74.44 percentage of officials suggested for updating of details about Eastern and Western Ghat development projects. Forest economy should be documented in order to illustrate the economic output through agroforestry systems adopted by farmers and to put their efforts in increasing nation's economy was the suggestion given by 72.22 per cent of extension officials.

CONCLUSIONS

It is concluded that, knowledge management through online agri-portals have been gaining gradual importance and utilization. Therefore the knowledge management process establishes former pillars for acquiring, organizing, storing, sharing and accessing of knowledge to yield profitable and sustainable output from agriculture and allied sector. In order to have effective and efficient knowledge management portals we should consider the related issues which affect the knowledge diffusion process. Content management issue had its quantum of effect on diffusion process. The contents to be added are validated and their organization pattern based on priorities given by extension officials explained in this article will drag the researchers and planners to stretch-out their views and able to find the ways and means to cope up the knowledge management issues in agri-portals to construct a path for the present techno agrarian era. The suggestions offered by the extension officials of Tamil Nadu to improve the contents of various sections of the agritech portal of TNAU need to be incorporated to make the portal more applicable for its users.

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